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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,380	10/20/2003	Mark Beaumont	DB001072-000	3361

57694 7590 10/09/2007

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EXAMINER	
JOHNSON, BRIAN P	

ART UNIT	PAPER NUMBER
2183	

MAIL DATE	DELIVERY MODE
10/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/689,380	BEAUMONT, MARK	
	Examiner	Art Unit	
	Brian P. Johnson	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *09 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-26 are pending.

Papers Filed

2. Examiner acknowledges receipt of amendment and remarks filed on 09 July 2007.

Claim Rejections - 35 USC § 101

1. Rejection is withdrawn in light of Applicant's amendments.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-2, 5-11, 15-16, and 19-26 are rejected under 35 U.S.C. 102(b) as being unpatentable by Taylor (U.S. Patent No. 4,992,933) in view of Barker (U.S. Patent No. 5,963,746).

As per claim 1, Taylor teaches a method of controlling a plurality of processing elements, comprising: at least certain of said processing elements (Fig. 1 array controller 14) maintaining a count, each count being responsive to a processing

element's location; selecting data in each processing element maintaining a count, for output in response to that processing element's count (col 4 line 67 to col 5 line 28).

Taylor does disclose a count for each processing element relative to its location (col 12 lines 20-48 and fig 11); however, Taylor fails to disclose that these counts are located within the processing element.

Barker discloses that "[c]ommunication between the PME is controlled by in and out register under control of the processing unit." (col 39 lines 35-38)

Taylor would have been motivated to keep the count within the individual processing element to simplify communication between processing elements. In particular, of an outside control device is not required for communication, this minimizes the exchange of various control signals the can be a strain on timing and efficiency.

It would have been obvious at the time of the invention for one of ordinary skill in the art to take the processing system of Taylor and allow its PE count to be maintained by the PE itself, rather than the array controller.

5. As per claim 2, Taylor/Barker teaches the method of claim 1 wherein said maintaining a count includes setting a counter to a first known value and altering the count at programmable intervals by a programmable amount, said storing occurring when a current count equals a target value. *The examiner asserts that in order to maintain a count, it must inherently be set to an initial value. Further, the examiner asserts that updating said count is inherent, as a count is useless unless it is updated on each iteration of the function it is counting. Data is stored in response the count:*

when the final shift has occurred (as detected by the count) the array elements retain the data of the final shift.

6. As per claim 5, Taylor/Barker teaches a method of controlling the data selected as output data by a plurality of processing elements, comprising:

issuing an instruction set to said plurality of processing elements, said instruction set being performed through a series of data shifts (Col. 2 lines 42-48), each processing element (Barker col 39 lines 35-38) receiving data from processing elements connected thereto as a result of data shifts (col 12 lines 20-48 and fig. 11)

maintaining a count responsive to said data shifts (col 12 lines 20-48)

and selecting data based on said counts, and saving said selected data. *The examiner asserts that data is selected when the final shift has occurred.*

7. As per claim 6, Taylor/Barker teaches the method of claim 5 wherein said instruction set includes one of an edge shift, planer shift, wrap shift and vector shift or a combination thereof. *Figure 7b discloses a wrap shift.*

8. As per claim 7, Taylor/Barker teaches the method of claim 5 wherein said data shifts include shifting data in one of a north, south, east and west, plus z and minus z directions. *Figure 7b discloses shifting in the west direction.*

9. As per claim 8, Taylor/Barker teaches a method of controlling the position of data in a plurality of processing elements, comprising:

shifting data within the plurality of processing elements along one of a row, column or diagonal; *The examiner asserts that data is shifted along rows in fig. 7b.*

each active processing element receiving data from processing elements connected thereto as result of data shifting (col 12 lines 20-48) each active processing element selecting from among the received data one of the received data as a final output in response to that processing element's location within the plurality of processing elements and saving said selected data. *The examiner asserts that final data is selected after the final shift has occurred. Each element maintains the data it has just received, based on its location in the array.*

10. As per claim 9, Taylor/Barker teaches the method of claim 8 additionally comprising loading an initial count into at least certain of said plurality of processing elements and calculating an initial count locally based on the processing element's location in the plurality and the function being performed on the data. *The examiner asserts that the array controller 14 constitutes a processing element, as it controls processing in the array. Array controller 14 inherently maintains a count to ensure that the proper number of shifts take place to achieve the desired results. For instance, for the array to accomplish the data reflection (col. 9-10) the controller must issue 1+n/2 shift instructions (col. 10 line 18).*

11. As per claim 10, Taylor/Barker teaches the method of claim 9 additionally comprising maintaining a current count in at least certain of said plurality of processing elements, said current count being responsive to said initial count and the number of data shifts performed, said selecting being responsive to said current count. *The examiner asserts that a current count is inherent to the loop control of Taylor/Barker's system. If a count were never updated on each iteration of the loop, the count would never increment or decrement, and the loop would never exit. The examiner further asserts that data is stored in response the count: when the final shift has occurred (as detected by the count) the array elements retain the data of the final shift.*

12. As per claim 11, *Taylor/Barker* teaches the method of claim 10 wherein said initial count is modified by a programmable amount at programmable intervals to produce said current count. *The examiner asserts that Taylor/Barker's system is programmed to operate as disclosed. It is inherent that the count is programmed to update as per the requirements of the system.*

13. As per claim 15, *Taylor/Barker* teaches the method of claim 8 wherein said shifting includes shifting data north to south, south to north, east to west, west to east, northeast to southwest, southwest to northeast, northwest to southeast and southeast to northwest. *The examiner asserts that all these shift directions take place in the shift mapped in Fig. 7a. Diagonal shifts are accomplished by means of two shifts consisting of a vertical and a horizontal shift.*

14. As per claim 16, *Taylor/Barker* teaches a method for controlling the position of data in a matrix of processing elements, comprising:

shifting data within the matrix of processing elements; *Fig. 7a and 7b illustrate shifting data in the matrix.*

Each active processing element receiving data from processing elements connected thereto as a result of said data shifting (col 12 lines 20-48)

maintaining a current count in each active processing element responsive to the number of data shifts; *The examiner asserts that the array controller 14 constitutes a processing element, as it controls processing in the array. Array controller 14 inherently maintains a count to ensure that the proper number of shifts take place to achieve the desired results. For instance, for the array to accomplish the data reflection (col. 9-10) the controller must issue 1+n/2 shift instructions (col. 10 line 18). The examiner asserts that the array controller constitutes an active processing element, as it keeps track of the count data for the entire array.*

and selecting output data for each active processing element form among the data that processing element has received as a function of that element's current count (Barker col 39 lines 35-38); and saving said selected data (col 12 lines 20-48)

15. As per claim 19, *Taylor/Barker* teaches the method of claim 16 wherein said shifting includes the north to south and south to north shifting of columns, the east to west and west to east shifting of rows, and the northeast to southwest, southwest to

northeast, northwest to southeast and southeast to northwest shifting of diagonals. *The examiner asserts that all these shift directions take place in the shift mapped in Fig. 7a. Diagonal shifts are accomplished by means of two shifts consisting of a vertical and a horizontal shift.*

16. As per claim 20, *Taylor/Barker* teaches a method, comprising: shifting data within a plurality of processing elements; and receiving data within each processing element from processing elements connected thereto as a result of said data shifting (col 12 lines 20-48 and Barker col 39 lines 35-38) receiving data within each processing element from processing elements connected thereto as a result of said data shifting (col 12 lines 20-48) each active processing element selecting (Barker col 38 lines 35-38) from anmont the data that processing element has received (col 12 lines 20-48) data as a final output in accordance with the formula f(x_Index, y_Index, z_Index) where f is dependent upon the desired output, and saving said selected data. *The examiner asserts that the shifts outlined in Fig. 7a and 7b constitute data being shifted within a plurality of processing elements. The examiner further asserts that data is stored in response to the elements' locations: when the final shift has occurred (as detected by the count) the array elements retain the data of the final shift, dependent on their location in the shift scheme.*

17. As per claim 21, *Taylor/Barker* teaches the method of claim 20 additionally comprising one of loading an initial count into each processing element and calculating

an initial count locally based on the processing element's location and the function f. *The examiner asserts that a count must inherently be maintained to execute the shift loop a predetermined number of times. If a count were not maintained, there would be no way to ensure the proper number of data shifts.*

18. As per claim 22, *Taylor/Barker* teaches the method of claim 21 additionally comprising maintaining a current count in each processing element, said current count being responsive to said initial count and the number of data shifts performed, said selecting being responsive to said current count. *The examiner asserts that a current count is inherent to the loop control of Taylor/Barker's system. If a count were never updated on each iteration of the loop, the count would never increment or decrement, and the loop would never exit. The examiner further asserts that data is stored in response the count: when the final shift has occurred (as detected by the count) the array elements retain the data of the final shift.*

19. As per claim 23, *Taylor/Barker* teaches a method, comprising: shifting data within a plurality of processing elements; and each active processing element selecting data as a final output in accordance with the formula f (d(0), d(1), d(2) . . . d(n-1)) where f is dependent upon the desired output. *The examiner asserts that the shifts outlined in Fig. 7a and 7b constitute data being shifted within a plurality of processing elements. The examiner further asserts that data is stored in response to the desired output: when the*

final shift has occurred (as detected by the count) the array elements retain the data of the final shift, dependent on their location in the shift scheme.

20. As per claim 24, *Taylor/Barker* teaches the method of claim 23 additionally comprising one of loading an initial count into each processing element and calculating an initial count locally based on the processing element's location and the function f. *The examiner asserts that a count must inherently be maintained to execute the shift loop a predetermined number of times. If a count were not maintained, there would be no way to ensure the proper number of data shifts.*

21. As per claim 25, *Taylor/Barker* teaches the method of claim 24 additionally comprising maintaining a current count in each processing element, said current count being responsive to said initial count and the number of data shifts performed, said selecting being responsive to said current count. *The examiner asserts that in order to maintain a count, it must inherently be set to an initial value. Further, the examiner asserts that updating said count is inherent, as a count is useless unless it is updated on each iteration of the function it is counting. Data is stored in response the count: when the final shift has occurred (as detected by the count) the array elements retain the data of the final shift.*

22. As per claim 26, *Taylor/Barker* teaches a memory device carrying a set of instructions which, when executed, perform a method comprising: maintaining a count

in a processing element, said count being responsive to said processing element's location (col 12 lines 20-48 and Barker col 39 lines 35-38); receiving data from processing elements connected to said processing element (col 12 lines 20-48) and for each processing element maintaining a count; storing data in response to its count. *The examiner asserts that the array controller 14 constitutes a processing element, as it controls processing in the array. Array controller 14 inherently maintains a count to ensure that the proper number of shifts take place to achieve the desired results. For instance, for the array to accomplish the data reflection (col. 9-10) the controller must issue 1+n/2 shift instructions (col. 10 line 18). The examiner further asserts that data is stored in response the count: when the final shift has occurred (as detected by the count) the array elements retain the data of the final shift.*

Selecting from among the received data (Barker col 39 lines 35-38) for output in response to said processing element's count; and saving said selected data.

23. Claims 3, 4, 12-14, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor/Barker.

24. As per claim 3, *Taylor/Barker* teaches the method of claim 1 but fails to disclose wherein said maintaining a count includes setting a counter to an initial value, and counting down from said initial value, said storing occurring when a current count is non-positive.

25. Official Notice is taken that counting down from an initial value is well known in the art. Counting down from an initial value to zero to determine the number of

iterations of a loop provides the benefit of not having to store a comparison value separate from zero. Without having to store the additional value, less hardware is necessary.

26. It would have been obvious to one of ordinary skill in the art at the time of invention to have implemented the loop count of the array controller by decrementing from an initial value to zero for the benefit of not having to store a comparison value with additional logic.

27. As per claim 4, *Taylor/Barker* teaches the method of claim 1 but fails to teach wherein said maintaining a count includes setting a counter to a first known value, and counting up from said first known value, said storing occurring when a current count equals a target count.

28. Official Notice is taken that incrementing a counter and comparing it to a stored comparison value is well known in the art.

29. Incrementing a local count provides a simple implementation to ensure a function is performed a correct number of times, ensuring proper operation of the processor.

30. It would have been obvious to one of ordinary skill in the art at the time of invention to have incremented a count in *Taylor/Barker*'s processor until it matched a stored value required by the NEWS setting to ensure the proper number of shifts was performed.

31. As per claim 12, *Taylor/Barker* teaches the method of claim 11 but fails to disclose wherein said modification includes one of incrementing and decrementing said initial count.

32. Official Notice is taken that counting down from an initial value is well known in the art. Counting down from an initial value to zero to determine the number of iterations of a loop provides the benefit of not having to store a comparison value separate from zero. Without having to store the additional value, less hardware is necessary.

33. It would have been obvious to one of ordinary skill in the art at the time of invention to have implemented the loop count of the array controller by decrementing from an initial value to zero for the benefit of not having to store a comparison value with additional logic.

34. As per claim 13, *Taylor/Barker* teaches the method of claim 12 wherein said selecting occurs when said current count is non-positive. *The examiner asserts that zero is a non-positive value.*

35. As per claim 14, *Taylor/Barker* teaches the method of claim 12 wherein said selecting occurs when said current count equals a target value. *The examiner asserts that zero constitutes a target value.*

36. As per claim 17, *Taylor/Barker* teaches the method of claim 16 but fails to teach wherein said current count is incremented in response to said data shifts and said selecting occurs when a target value is reached.

37. Official Notice is taken that incrementing a counter and comparing it to a stored comparison value is well known in the art.

38. Incrementing a local count provides a simple implementation to ensure a function is performed a correct number of times, ensuring proper operation of the processor.

39. It would have been obvious to one of ordinary skill in the art at the time of invention to have incremented a count in *Taylor/Barker*'s processor until it matched a

stored value required by the NEWS setting to ensure the proper number of shifts was performed.

40. As per claim 18, *Taylor/Barker* teaches the method of claim 16 wherein said current count is decremented from an initial count and said selecting occurs when said current count reaches a non-positive value.

41. Official Notice is taken that counting down from an initial value is well known in the art. Counting down from an initial value to zero to determine the number of iterations of a loop provides the benefit of not having to store a comparison value separate from zero. Without having to store the additional value, less hardware is necessary.

42. It would have been obvious to one of ordinary skill in the art at the time of invention to have implemented the loop count of the array controller by decrementing from an initial value to zero for the benefit of not having to store a comparison value with additional logic.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

2. Examiner notes that the Taylor col 12 lines 40-48 indicate shifting of data between processing elements a set number of times. This number of shifts is a count

that is maintained relative to the location of the processing element. Before the addition of Barker, it is unclear what element of Taylor is counting the shifts (i.e. maintaining the count); it may have been done in the control. The addition of Barker ensures that each processing elements count is maintained within the respective processing element, which satisfies all limitations of the claimed invention.

3. Applicant additionally argues that no selecting occurs in Taylor. This is incorrect. As Taylor col 12 lines 40-48 indicate, data is shifted a plurality of times before a final destination occurs. The data is selected by the final Processing Element after all shifts have occurred. This issue has been further clarified with the addition of Barker, assuring that the "selecting" occurs within the processing element, rather than a separate control.

Conclusion

43. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bratt et al. (U.S. Patent No. 6,877,020) disclose a matrix of processing elements performing various shift operations on the data in said elements.

Crozier (U.S. Patent No. 5,081,700) discloses a system for rotating an image by means of shifting data in an array.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P Johnson whose telephone number is (571) 272-2678. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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